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**Self-Esteem, Relationship Threat, and Dependency Regulation: Independent Replication of
Murray, Rose, Bellavia, Holmes, and Kusche (2002) Study 3**

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Abstract

Across three studies, Murray et al. (2002) found that low self-esteem individuals responded in a negative manner compared to those high in self-esteem in the face of relationship threat, perceiving their partners and relationships less positively. This was the first empirical support for the hypothesized dynamics of a dependency regulation perspective, and has had a significant impact on the field of relationship science. In the present research, we sought to reproduce the methods and procedures of Study 3 of Murray et al. (2002) to further test the two-way interaction between individual differences in self-esteem and situational relationship threat. Manipulation check effects replicated the original study, but no interaction between self-esteem and experimental condition was observed for any primary study outcomes.

Keywords: Self-esteem, rejection, romantic relationships, replication, reproducibility

Self-Esteem, Relationship Threat, and Dependency Regulation: Independent Replication of Murray, Rose, Bellavia, Holmes, and Kusche Study 3

A dependency regulation perspective on relationship processes suggests that individual differences in self-esteem should place constraints on the ability to maintain relationship-enhancing thoughts, feelings and behaviors in the face of potential threats, real or perceived, to the relationship (e.g., Murray, Holmes, & Griffin, 2000; Murray, Holmes, Griffin, Bellavia, & Rose, 2001). Specifically, individuals low in self-esteem should have a low threshold for perceiving threats to the relationship, overreact in the face of such threats, interpret the threat as a signal of their partner's weakening affections, and minimize the importance of the relationship to themselves to lessen the sting of perceived rejection. Individuals high in self-esteem, however, should be better equipped to handle potential relationship threats, and may use these moments to affirm their love and affection for their partners.

Murray et al. (2002) provided the first empirical evidence for these hypothesized processes across three experiments. Specifically, low self-esteem individuals were found to psychologically distance themselves from their partner and relationship in the face of relationship threat (manipulated in three different ways), whereas high self-esteem individuals showed some tendencies to affirm their partner and relationship in the face of relationship threat. The first two studies recruited individuals involved in romantic relationships and asked participants to imagine different scenarios to manipulate relationship threat. Study 3, however, recruited both partners to more realistically manipulate relationship threat. In that study, both partners completed questionnaires in the same room, but were seated facing away from each other, so that they could not see each other's responses. Relationship threat was manipulated by leading one partner to believe that his or her partner had many problems with the relationship.

This more realistic manipulation of relationship threat yielded a relatively consistent pattern of interactions between self-esteem and experimental condition predicting study outcomes compared to the first two studies, and the full package of studies is cited as early strong support for the dependence regulation perspective on relationship processes. Indeed, this paper has been cited over 250 times on Google Scholar to date. This is also an excellent example of research testing theoretically-derived hypotheses regarding relationship processes from a person by situation perspective.

Although the experimental procedure introduced in Study 3 of Murray et al. (2002) has been used by others (e.g., Murray, Derek, Leder, & Holmes, 2008; Murray, Lupien, & Seery, 2012), these additional applications have tested new hypotheses related to the dependency regulation perspective. Other studies have replicated the pattern of the interaction between self-esteem and relationship threat as reported by Murray et al. (2002), however, these efforts are best characterized as conceptual rather than direct or close replications as they use different manipulations of relationship threat, or measure relationship experiences associated with greater relationship threat, as well as different measures of relationship evaluation (e.g., Cavallo, Fitzsimons, & Holmes, 2009; DeHart, Pelham, & Murray, 2004; Murray, Griffin, Rose, & Bellavia, 2003). Given the significant impact of this research on the field of relationship science, and the importance of direct, or close, replications to verify the existence of an effect (LeBel, Berger, Campbell, & Loving, 2017), we conducted a close replication of Murray et al.'s (2002) Study 3. After consulting with Dr. Sandra Murray regarding many details of the study, we pre-registered our replication report (e.g., hypotheses, procedure, methods) on the Open Science Framework (OSF; <https://osf.io/w5q4g/>), following the regulations of the pre-registration challenge (<https://cos.io/our-services/prereg/>).

Methods

Participants

We estimated the required replication sample size in two ways. First, we estimated the effect size from the original study to be $f^2 = .076$. Using this effect size, a power analysis (power estimated using G-Power 3.1; Faul, Erdfelder, Buchner, & Lang, 2009) indicated that a sample size of 173 participants (one partner from each of 173 couples) would be needed to achieve 95% power in a regression model with 3 predictors (2 main effects and an interaction). Second, the original study had 65 participants (from 65 couples recruited). Simonsohn's (2015) 2.5x rule for replication studies (i.e., recruiting 2.5 times more participants than the original) suggests a minimum of 163 participants. By placing ads in the Western University student newspaper and on local social media (e.g., Facebook, Twitter, Kijiji), contacting couples who had previously participated in studies with our lab, as well as placing flyers around campus, and making brief announcements in classrooms at Western University and its affiliates, we recruited both members of 203 romantically involved couples. One couple was removed because the male participant did not appear to be responding to the actual items (responses followed a repeating left-to-right diagonal pattern across items). Couples were randomly assigned to condition. In the experimental condition, one participant from each couple was randomly pre-selected for analysis before data collection took place (see Procedure below). In the control condition, we randomly selected one partner from each couple for the analysis after data collection took place (the relevant code is available at <https://osf.io/yyrw6/>). There were therefore 202 participants for data analyses, with 104 men and 98 women. Participants average relationship length was $M = 26.54$ ($SD = 23.79$) months, and the average age of participants was $M = 21.00$ ($SD = 4.44$) years.

Procedure

The materials and procedure of these studies were conducted in accordance with the input of Dr. Sandra Murray, the first author of the original article. Upon arriving to the laboratory, couples were told that the purpose of the study was to examine the thoughts and feelings that couples in dating relationships commonly experience. Participants were seated at two tables with their backs facing each other, and were told that the study would take approximately one hour to complete. First, the researcher confirmed that participants met the inclusion criteria (i.e., dating for a minimum of four months and 18 years of age or older). Next, the researcher provided participants with the letter of information and asked that each participant read the letter and sign the consent form if they agreed to participate in the study. The researcher then explained to the participants that they would be completing identical sets of questionnaires and would proceed from one questionnaire to the next when both members of the couple had finished. Participants were also asked not to speak to each other as the study progressed and were politely reminded if they forgot this instruction during the task.

All responses were collected via pencil and paper questionnaires, as in the original study. Participants were first asked to complete some demographic information (i.e., relationship length, age, gender, ethnicity, and relationship status). Next, participants completed three scales asking about themselves and their relationships (i.e., self-esteem, attachment, and relationship satisfaction). They then progressed to the experimental manipulation, which was a writing task asking participants to write about either (A) aspects of their partner they do not like (a task that typically does not take that much time to complete), or (B) to list as many of the things in the room where they live that they could think of (a task that typically takes much more time to complete). In the control condition, both partners completed writing task (A), whereas in the experimental condition, one partner was pre-selected to complete writing task (A) while the other

partner completed writing task (B). Given the disparities in time that it usually takes participants to complete these two tasks, participants who completed task (A) were often left waiting for their partners to complete task (B)¹, which was intended to increase their perception that their partners perceived many faults in them. In the experimental condition, participant data provided by the partner who completed task (B) were discarded leaving only the data provided by the partner who completed task (A) for analysis. In both conditions, the experimenter was instructed to stop participants should they take longer than five minutes to complete this task and the amount of time it took both partners to complete these tasks was discretely recorded.

Participants then completed a series of questionnaires regarding themselves, their partner, and their relationship as described below (e.g., state self-esteem, perceived partner commitment, etc.). Importantly, most of the questionnaires were brief and participants and their partner typically completed the surveys beyond the writing task simultaneously. After completing these questionnaires, participants were probed for suspicion, debriefed, paid for participation, and thanked for their time. Two participants did express suspicion, but the reported results do not change when these participants are removed (the analytic code posted on the OSF contains information on how to re-run the analyses with these two participants removed).

Measures

All measures used in the present research, including the wording used for the two writing tasks (i.e., manipulation), can be found at: <https://osf.io/q8dx5/>. These measures are described in

¹ The experimenter surreptitiously recorded how long each participant took, in seconds, to complete the writing task (due to some errors in recording, times were only recorded for 156 participants [73 in the experimental condition]). Consistent with results of Murray et al., target participants in the experimental condition ($M = 73.97$, $SD = 77.57$) spent significantly longer waiting than did target participants in the control condition ($M = 15.05$, $SD = 36.67$), $t(99) = -5.93$, $p < .0001$, Cohen's $d = .99$

detail in Murray et al. (2002), and therefore we provide only a brief overview of each measure. For individual measures that are not combined with others to create composite variables, we describe the nature of high and low scores; for the other measures that are combined, we discuss the nature of high and low scores of their composite variables.

Demographics. Participants were asked to indicate their gender, age, duration of their current romantic relationship, ethnicity, and relationship status.

Self-esteem. Rosenberg's (1965) 10-item measure was used to assess individual differences in global self-esteem ($\alpha = .90$) using a 7-point scale (anchored 1 = *strongly disagree*, 7 = *strongly agree*). Higher scores indicated more positive self-esteem.

Unconditional regard. This seven-item measure was used to assess the degree to which participants felt their partners accepted them despite their own faults or limitations ($\alpha = .76$) on a 9-point scale (anchored 1 = *not at all true*, 9 = *completely true*).

Secure base. This four-item measure tapped participants' beliefs that they could rely on their partner for comfort and support ($\alpha = .54$) on a 9-point scale (anchored 1 = *not at all true*, 9 = *completely true*).

Idealization by partner. This five-item measure assessed participants' perceptions that their partner saw greater virtue in their qualities and attributes compared to others ($\alpha = .76$) on a 9-point scale (anchored 1 = *not at all true*, 9 = *completely true*).

Partner global evaluation. This three-item measure assessed participants' perceptions of their partner's global adoration for the self ($\alpha = .82$) on a 9-point scale (anchored 1 = *not at all true*, 9 = *completely true*).

Perceived partner commitment. This three-item measure assessed participants' perceptions of their partner's commitment to the relationship ($\alpha = .71$) on a 9-point scale (anchored 1 = *not at all true*, 9 = *completely true*).

Projections of partner behavior. This 14-item measure assessed participants' perceptions of their partner's likely accepting and rejecting behaviors of them in the future ($\alpha = .86$) on a 7-point scale (anchored 1 = *rarely, if ever*, 7 = *frequently*). A 12-item measure assessing participants' perceptions of their own likely accepting and rejecting behaviors toward their partners was not part of the original analyses and is therefore not discussed further.

Perceived partner traits. This 24-item measure assessed participants' perceptions of their partners across 24 traits and characteristics ($\alpha = .87$) on a 9-point scale (anchored 1 = *not at all characteristic*, 9 = *completely characteristic*).

Inclusion of other in self. This one-item measure, originally created by Aron, Aron, Tudor and Nelson (1991), assessed subjective closeness by asking participants to select one of a series of seven overlapping circles that best represents how close or connected they feel with their partners.

Closeness. This five-item measure also assessed participants' feelings of how close or connected they feel with their partner ($\alpha = .85$) on a 9-point scale (anchored 1 = *not at all true*, 9 = *completely true*).

Mood. This seven-item measure assessed participants' current mood ($\alpha = .79$) on a 7-point scale (anchored 1 = *not at all*, 7 = *very*). Higher scores indicate more positive mood.

State self-esteem. This 19-item measure assessed current self-evaluations ($\alpha = .95$) on 7-

point bipolar dimensions (e.g., 1 = *liked*, 7 = *disliked*; 1 = *worthless*, 7 = *valuable*). Higher scores indicated more positive state self-esteem.

Perceived partner alternatives. This five-item measure assessed participants' perceptions of their partner's ability to find another romantic partner ($\alpha = .62$) on a 9-point scale (anchored 1 = *not at all true*, 9 = *completely true*).

Partners willingness to forgive self. These two 11-item measures assessed participants' beliefs regarding how willing their partner would be to forgive them if they (a) criticized or embarrassed their partner in front of others, and (b) lied to their partner about something important ($\alpha = .87$ and $.86$ respectively). For each measure, eight bipolar dimensions assessed perceptions of rejection or acceptance (e.g., 1 = *insecure*, 7 = *secure*; 1 = *close to me*, 7 = *distant from me*), and three items assessed participants' perceptions of how their partner would appraise the transgression on 9-point scales (anchored 1 = *none*, 9 = *a great deal*).

Willingness to forgive partner. These two 11-item measures assessed how likely participants would be to forgive their partner if their partner (a) criticized or embarrassed them in front of others, or (b) lied to them about something important ($\alpha = .86$ and $.88$ respectively). For each measure, eight bipolar dimensions assessed anticipated rejection or acceptance (e.g., 1 = *insecure*, 7 = *secure*; 1 = *close to my partner*, 7 = *distant from my partner*), and three items assessed how the participant would appraise their partner's transgression on 9-point scales (anchored 1 = *none*, 9 = *a great deal*).

Manipulation check. This three-item scale measured participants' (a) beliefs that their partners listed more, or less, negative things about their character than they expected (anchored 1 = *at lot less than I expected*, 9 = *a lot more than I expected*), (b) feelings regarding how serious

the things were that their partners listed (anchored 1 = *not at all serious*, 9 = *very serious*), and (c) feelings of concern regarding the items listed by their partners (anchored 1 = *not at all concerned*, 9 = *extremely concerned*; $\alpha = .41$). Higher scores indicated more overall negativity regarding perceptions of what their partner wrote. Participants were also asked to estimate the number of negative aspects of their character they thought their partner listed.

Composite Variables

Perceived acceptance. An index of *perceived acceptance* was created by averaging the standardized scores of the following measures: unconditional regard, secure base, idealization by partner, partner global evaluation, perceived partner commitment, and the two measures of partner's willingness to forgive self ($\alpha = .81$). Higher scores indicate greater perceived acceptance from the partner.

Partner enhancement. An index of *partner enhancement* was created by averaging the standardized scores of the following measures: projections of partner behavior, perceived partner traits, perceived partner alternatives, and the two measures of willingness to forgive the partner ($\alpha = .63$). Higher scores indicate more positive partner enhancement.

Closeness. An index of *closeness* was created by averaging the standardized scores of the following measures: closeness, and the inclusion of other-in-self ($\alpha = .74$). Higher scores indicated greater subjective closeness to the partner.

Results

The data and code needed to reproduce the analyses presented in this manuscript (or to conduct desired follow-up analyses) can be found at <https://osf.io/wb6vc/>. For descriptive

purposes the correlations among the study variables tabulated across experimental condition are presented in Table 1.

Murray et al. (2002) used a multiple regression model with condition (coded 0 = control, 1 = experimental), mean centered self-esteem, and the interaction between the two as predictor variables to test their hypotheses. The interaction between self-esteem and condition was the primary test of the hypothesis, with the predicted pattern of results being no observed differences between low and high self-esteem individuals in the control condition and significant differences between low and high self-esteem individuals in the experimental condition. Specifically, low self-esteem individuals would report, for example, less partner enhancement in the experimental condition than high self-esteem individuals, but this pattern would not hold in the control condition. We used the same data analytic strategy.

Presented in Table 2 are the results of models with the two outcome variables used in the original research to assess the effectiveness of the manipulation. Both unstandardized and standardized regression coefficients are presented. In each of these models a significant main effect of condition emerged that was consistent with the original study. For the manipulation check measure, participants in the experimental condition reported higher scores ($M = 4.83$, $SD = 1.25$) than those in the control condition ($M = 4.24$, $SD = 1.42$; Cohen's $d = .44$). The standardized regression coefficient was higher in the original study (.38) than in the present study (.207). Regarding the number of inferred negative items the partner listed, participants in the experimental condition inferred more items listed ($M = 5.07$, $SD = 3.40$) than those in the control condition ($M = 3.43$, $SD = 1.65$; Cohen's $d = .62$). The standardized regression coefficient in the original study was lower (.24) than in the current study (.293). Also, consistent with the original study there were no interactions between self-esteem and condition for these

two measures. The results of these analyses suggest that the manipulation was successful in activating concerns among those in the experimental compared to control condition that their partners perceived a few too many faults in them.

Presented in Table 3 are the results of the models with the four primary dependent variables. Murray et al. (2002) did not find a significant interaction when predicting perceived acceptance, but did find support for the predicted two-way interaction between self-esteem and condition when predicting partner enhancement ($p < .05$), closeness ($p = .13$), and state self-esteem ($p < .05$). In the current study, although we found associations in the expected direction between individual differences in self-esteem and three of these outcome variables, contrary to predictions we did not observe any significant effects of experimental condition or any significant interactions between self-esteem and experimental condition. Given the absence of any interactions between self-esteem and experimental condition, we did not further investigate patterns of simple effects.

Discussion

In conducting this close replication of Murray et al. (2002) Study 3 we sought and received the input of the original corresponding author, pre-registered our hypotheses in a replication report on the OSF, collected a sample of participants over two and half times larger than the original study, and posted our data and annotated analytic code on the OSF. We did so in a sincere effort to make the results of this replication study as informative as possible regarding the interaction between relationship threat and self-esteem in predicting outcomes from a dependency regulation perspective.

Results of the manipulation check variables clearly demonstrated that the manipulation of relationship threat was effective, replicating the results of the original study across three different measures. That is, target participants in the experimental condition waited longer for their partners to complete the writing task than target participants in the control condition. Target participants in the experimental condition also scored higher on the manipulation check measure, and inferred that their partners wrote more negative things about them and the relationship, compared to target participants in the control condition. Using this experimental protocol with both romantically involved partners, therefore, seems useful for generating a heightened sense of relationship threat in the experimental compared to control condition.

Results of the primary test of the hypothesis, however, did not provide any empirical support that low and high self-esteem individuals should respond differently in the experimental compared to control conditions. The interaction coefficients across the four regression models were all near zero, with 95% confidence intervals suggesting the interpretation of the interaction could vary a great deal given the possible positive or negative values of the coefficients. These results are therefore inconsistent with those of the original research.

We cannot provide definitive answers for why our results testing the hypothesized interaction between self-esteem and manipulated relationship threat yielded non-significant effects. Given that we replicated the effects of the manipulation checks, it seems unlikely that it was due to improperly implementing the experimental protocol. Sampling error is a concern with every study, and is one reason why we recruited a much larger sample than the original study; still, it cannot be ruled out. It may also be that the interactive effect of self-esteem and situationally manipulated relationship threat is much smaller than currently estimated, requiring a sample size well beyond the 202 participants recruited in our study. Additionally, it may be that

self-esteem does indeed play a role in regulating interpersonal perceptions and feelings in relationships regardless of the presence of an acute threat to the relationship. If so, the dependency regulation model may need to be modified.

Making firm conclusions based on the results of one study, however, is not the best approach when evaluating theory. Although we feel the results of our research should give pause to researchers that assume individual differences in self-esteem shunt people toward different relationship protecting or enhancing pathways in the face of relationship threat, additional research should consider conditions that may be more likely to elicit the hypothesized effects.

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Table 1

Correlations among study variables ($N = 202$)

<u>Variables</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>
1. Self-Esteem	—									
2. Manipulation Check	-.23**	—								
3. Inferred Number Negative Traits	-.15*	.44**	—							
4. Perceived Acceptance	.26**	-.33**	-.35**	—						
5. Partner Enhancement	.36**	-.39**	-.36**	.75**	—					
6. Closeness	.18*	-.21**	-.19*	.61**	.41**	—				
7. State Self-Esteem	.60**	-.19*	-.20**	.48**	.48**	.32**	—			
8. Mood	.48**	-.28**	-.22**	.45**	.45**	.37**	.72**	—		
9. Experimental Condition	-.03	.21**	.30**	.02	.00	.03	-.01	-.02	—	
10. Gender	-.10	.15*	.00	.21**	.03	-.08	.15*	.07	.01	—

* $p < .05$, ** $p < .01$; Condition: control = 0, experimental = 1; Gender: men = 0, women = 1

Table 2

Regression coefficients and statistics for outcome variables used to assess effectiveness of manipulation

<u>Variable</u>	<u>Manipulation Check</u>			<u>Inferred Number of Negative Items</u>		
	<u>b</u>	<u>SE(b)</u>	<u>β</u>	<u>b</u>	<u>SE(b)</u>	<u>β</u>
Intercept	4.254	.129	—	3.442	.261	—
Self-esteem	-.256 (-.544,.032)	.146	-.176+	-.448 (-1.03,.134)	.295	-.152
Condition	.563 (.200,.925)	.183	.207**	1.623 (.888,2.35)	.373	.293***
Interaction	-.136 (-.524,.252)	.197	-.069	.011 (-.777,.799)	.399	.003

+ $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$; 95% CI presented in parentheses; Self-esteem was centered at its mean; Condition: control = 0, experimental = 1; $df = 198$ (Manipulation Check), and 196 (Inferred Number of Negative Items)

Table 3

Regression coefficients and statistics for outcome variables used to test primary hypothesis

	<u>Perceived Acceptance</u>			<u>Partner Enhancement</u>			<u>Closeness</u>			<u>State Self-Esteem</u>		
<u>Variable</u>	<u>b</u>	<u>SE(b)</u>	<u>β</u>	<u>b</u>	<u>SE(b)</u>	<u>β</u>	<u>b</u>	<u>SE(b)</u>	<u>β</u>	<u>b</u>	<u>SE(b)</u>	<u>β</u>
Intercept	-.427	.066	—	.091	.059	—	-.027	.088	—	5.468	.071	—
Self-Esteem	.202 (.055,.349)	.074	.278**	.216 (.083,.349)	.067	.319**	.158 (-.037,.353)	.099	.167	.571 (-.544,.032)	.081	.601***
Condition	.031 (-.154,.215)	.093	.022	.006 (-.160,.173)	.084	.005	.054 (-.191,.299)	.124	.031	.006 (-.194,.206)	.101	.003
Interaction	-.019 (-.217,.178)	.100	-.019	.046 (-.132,.224)	.090	.051	.022 (-.241,.284)	.133	.017	-.000 (-.214,.214)	.109	.000

** $p < .01$, *** $p < .001$; 95% CI presented in parentheses; Self-esteem was centered at its mean; Condition: control = 0, experimental = 1; $df = 198$